We claim:

1. A cell stack comprising:

a first cell, a second cell and a bipolar plate, the first cell and the second cell each comprising an anode and a cathode, with the first cell and the second cell aligned such that the anode of the first cell is located adjacent to the cathode of the second cell,

wherein the bipolar plate comprises a polymer layer and a first electrically conductive structure passing through the polymer layer, wherein the electrically conductive structure provides electrical contact between the anode of the first cell and the cathode of the second cell.

2. The electrochemical cell of claim 1 wherein the first electrically conductive structure comprises a protuberance that passes through the polymer layer.

3. The electrochemical cell of claim 2 wherein the protuberance comprises a rod having an elongated major axis relative to a minor axis.

4. The electrochemical cell of claim 3 wherein the rod further comprises a head portion located on at least one end of the rod.

5. The electrochemical cell of claim 4 further comprising a current collector held against at least one surface of the polymer layer by the head portion.

6. The electrochemical cell of claim 3 wherein the rod further comprises a nut on the rod within the anode of the first cell.

7. The electrochemical cell of claim 6 further comprising a current collector held against at least one surface of the polymer layer by the nut.

8. The electrochemical cell of claim 2 further comprising sealing elements that seal the protuberance to the polymer layer to prevent fluid leakage through the polymer layer.

9. The electrochemical cell of claim 8 wherein the sealing elements comprise o-rings.

10. The electrochemical cell of claim 1 wherein the first electrically conducting structure comprises a conductive sheet that passes though the polymer layer.

11. The electrochemical cell of claim 10 wherein the conductive sheet comprises a conductive foil.

12. The electrochemical cell of claim 10 wherein the conductive sheet comprises a conductive grid.

13. The electrochemical cell of claim 10 wherein the conductive sheet is aligned along the surface of at least one side of the polymer layer.

14. The electrochemical cell of claim 10 wherein the polymer layer further comprises an air plenum on one side of the polymer layer for supplying air to the cathode.

15. The electrochemical cell of claim 14 wherein the air plenum comprises an opening along the surface of one side of the polymer layer.

16. The electrochemical cell of claim 14 wherein the cathode is aligned adjacent to the air plenum.

17. The electrochemical cell of claim 10 wherein the conductive sheet is sealed to the polymer layer by a thermoplastic polymeric material to prevent fluid flow though the polymer layer.

18. The electrochemical cell of claim 1 wherein the polymer layer comprises a polymer selected from the group consisting of polyethylene, poly(tetraflurorethylene), poly(propylene), poly(vinylidene fluoride), poly(vinyl chloride), polyurethane, and blends and copolymers thereof.

19. The electrochemical cell of claim 1 wherein the conductive structure comprises a metal, a metal alloy, a conductive polymer or a combination thereof.

20. The electrochemical cell of claim 1 wherein the bipolar plate comprises a second electrically conductive structure passing though the polymer layer.

21. The electrochemical cell of claim 20 wherein the first electrically conductive structure and the second electrically conductive structure comprise conductive protuberances.

22. The electrochemical cell of claim 20 wherein the first electrically conductive structure and the second electrically conductive structure comprise conductive sheets.

23. The electrochemical cell of claim 20 wherein the first electrically conductive structure comprises a conductive protuberance and the second electrically conductive structure comprises a conductive sheet.

24. The electrochemical cell of claim 1 wherein the conductive structure maintains the spacing between the anode and the adjacent cathode.

25. A bipolar plate for an electrochemical cell comprising:

a polymer layer;

an electrically conducting structure passing through the polymer layer; and

a sealing element which seals the electrically conducting structure to the polymer layer and prevent fluids from passing though the polymer layer.

26. The bipolar plate of claim 25 wherein the electrically conducting structure comprises a rod having an elongated major axis relative to a minor axis.

27. The bipolar plate of claim 25 wherein the electrically conducting structure comprises a conductive sheet inserted through an opening in the polymer layer.

28. The bipolar plate of claim 27 wherein the conductive sheet comprises a conductive foil.

29. The bipolar plate of claim 27 wherein the conductive sheet comprises a conductive grid.

30. The bipolar plate of claim 27 wherein the polymer layer further comprises an air plenum for supplying air to one side of the bipolar plate.

31. A method of making a fuel cell comprising:

assembling a fuel cell stack by positioning a cell plate between an anode of a first cell and a cathode of an adjacent cell, wherein the cell plate comprises a polymer layer and an electrically conductive structure that passes through the polymer layer to provide an electrical connection between the anode of the first cell and the cathode of the adjacent cell.

32. The method of claim 31 further comprising sealing adjacent cell plates to form the fuel cell stack.

33. The method of claim 31 wherein the electrically conductive structure comprises a protuberance having an elongated major axis relative to a minor axis.

34. The method of claim 31 further comprising establishing the distance between the anode of one cell and the cathode of an adjacent cell by selecting the length of the protuberance.

35. The method of claim 31 wherein the electrically conductive structure comprises a conductive sheet.